CLAIMS

1. An optical interconnect system, comprising:

a first GRIN rod lens and a second GRIN rod lens;

said first GRIN rod lens having a first end and a second end, and further having a preselected length, a preselected width and a preselected index of refraction;

said second GRIN rod lens having a first end and a second end, and further having a preselected length, a preselected width and a preselected index of refraction;

means fixedly secured to said first end of said first GRIN rod lens for emitting electromagnetic radiation, said emitting means comprising an array of emitters;

means fixedly secured to said second end of said second GRIN rod lens for receiving said emitted electromagnetic radiation, said receiving means comprising an array of detectors, each detector from said array of detectors having substantially a preselected size;

said first GRIN rod lens forming an image of said emitting means substantially at infinity;

said second GRIN rod lens having its first end spaced apart and proximate said second end of said first GRIN rod lens;

said first end of said second GRIN rod lens and said second end of said first GRIN rod lens defining a space therebetween, wherein said space being substantially void of any optical component; and

said second GRIN rod lens forming an image of said emitting means onto said receiving means, said image formed onto said receiving means comprising an array of sub-images, each sub-image from said array of sub-images having substantially a preselected size;

wherein said preselected size of each detector from said array of detectors being larger than said preselected size of each sub-image from the array of sub-images..

2. The optical interconnect system as defined in claim 1 wherein said preselected length and said preselected width of said first and said second GRIN rod lens, respectively, is defined to permit each

of said first GRIN rod lens and said second GRIN rod lens to have some degree of flexibility.

3. The optical interconnect system as defined in claim 1 wherein at least one of said GRIN rod lenses is of a curved configuration.

4. The optical interconnect system as defined in claim 1 wherein said array of emitters comprises a hexagonal array of emitters; and, wherein said array of detectors comprises a hexagonal array of detectors.

5. The optical interconnect system as defined in claim 1 further comprising, in combination therewith:

means for providing electrical signals and converting said electrical signals into optical signals;

said electrical signal providing and converting means being operably connected to said means for emitting said electromagnetic radiation, said electromagnetic radiation being in the form of optical signals.

6. An optical interconnect system, comprising:

a first GRIN rod lens, said first GRIN rod lens having a first end and a second end, and further having a preselected length, a preselected width and a preselected index of refraction;

a second GRIN rod lens, said second GRIN rod lens having a first end and a second end, and further having a preselected length, a preselected width and a preselected index of refraction;

means fixedly secured to said first end of said first GRIN rod lens for emitting electromagnetic radiation, said emitting means comprising an array of emitters;

means fixedly secured to said second end of said second GRIN rod lens for receiving said emitted electromagnetic radiation, said receiving means comprising an array of detectors, each detector from said array of detectors having substantially a preselected size;

said first GRIN rod lens and said emitting means being attached to a first circuit board;

said second GRIN lens and said receiving means being attached to a second circuit board;

said first GRIN rod lens forming an image of said emitted radiation substantially at infinity; and

said second GRIN rod lens forming an image of said emitted electromagnetic radiation from said first GRIN rod lens onto said receiving means, said image formed onto said receiving means comprising an array of sub-images, each sub-image from said array of sub-images having substantially a preselected size;

wherein said preselected size of each detector from said array of detectors being larger than said preselected size of each sub-image from the array of sub-images.

7. The optical interconnect system as defined in claim 6 wherein said preselected length and said preselected width of said first and said second GRIN rod lens, respectively, is defined to permit each of said first GRIN rod lens and said second GRIN rod lens to have some degree of flexibility.

8. The optical interconnect system as defined in claim 6 wherein at least one of said GRIN rod lenses is of a curved configuration.

9. The optical interconnect system as defined in claim 6 wherein said array of emitters comprises a hexagonal array of emitters; and, wherein said array of detectors comprises a hexagonal array of detectors.

10. The optical interconnect system as defined in claim 6 further comprising, in combination therewith:

means for providing electrical signals and converting said electrical signals into optical signals;

said electrical signal providing and converting means being operably connected to said means for emitting said electromagnetic

radiation, said electromagnetic radiation being in the form of optical signals.

11. An optical interconnect system, comprising:

a first GRIN rod lens, said first GRIN rod lens having a first end and a second end, and further having a preselected length, a preselected width and a preselected index of refraction;

a second GRIN rod lens, said second GRIN rod lens having a first end and a second end, and further having a preselected length, a preselected width and a preselected index of refraction;

means fixedly secured to said first end of said first GRIN rod lens for emitting electromagnetic radiation, said emitting means comprising an array of emitters;

means fixedly secured to said second end of said second GRIN rod lens for receiving said emitted electromagnetic radiation, said receiving means comprising an array of detectors, each detector from said array of detectors having substantially a preselected size;

said first GRIN rod lens and said emitting means being attached to a first multi-chip module;

said second GRIN lens and said receiving means being attached to a second multi-chip module;

said first GRIN rod lens forming an image of said emitted radiation substantially at infinity; and

said second GRIN rod lens forming an image of said emitted electromagnetic radiation from said first GRIN rod lens onto said receiving means, said image formed onto said receiving means comprising an array of sub-images, each sub-image from said array of sub-images having substantially a preselected size;

wherein said preselected size of each detector from said array of detectors being larger than said preselected size of each sub-image from the array of sub-images.

12. The optical interconnect system as defined in claim 6 wherein said preselected length and said preselected width of said first and said second GRIN rod lens, respectively, is defined to permit

each of said first GRIN rod lens and said second GRIN rod lens to have some degree of flexibility.

13. The optical interconnect system as defined in claim 6 wherein at least one of said GRIN rod lenses is of a curved configuration.

14. The optical interconnect system as defined in claim 6 wherein said array of emitters comprises a hexagonal array of emitters; and,
wherein said array of detectors comprises a hexagonal array of detectors.

15. The optical interconnect system as defined in claim 6 further comprising, in combination therewith:
means for providing electrical signals and converting said electrical signals into optical signals;
said electrical signal providing and converting means being operably connected to said means for emitting said electromagnetic radiation, said electromagnetic radiation being in the form of optical signals.